

AMENDMENTS TO THE CLAIMS

1. (Currently amended) An injection device comprising: a housing, a nozzle assembly removably associated with the housing and defining a fluid chamber, a plunger; a trigger assembly, an energy generating source operatively associated with the trigger assembly so that movement of the trigger assembly activates the energy source to move the plunger in a first direction and expel a fluid from the fluid chamber, and a fixed injection-assisting probe at a distal end of the injection device, said injection-assisting probe comprising:

a body fixed to a distal end of the nozzle assembly; and

a discharge channel extending through the probe body, in fluid communication at a first end with the fluid chamber, and terminating at a second end in an orifice through which the fluid is expelled;

wherein the energy source and discharge channel are configured to expel the fluid through the orifice to jet inject the fluid, and the discharge channel has a channel portion at the second end with a ratio of length to average diameter ratio greater than 6/1.

2. (Canceled)

3. (Currently amended) The injection device of claim 1, wherein the ~~discharge channel length to diameter~~ ratio is at least 9/1.

4. (Currently amended) The injection device of claim 1, wherein the ~~orifice~~ average diameter of the discharge channel is between 0.004 to 0.012 inches along the length over which the ratio is measured.

5. (Currently amended) The injection device of claim 1, wherein a ~~discharge channel~~ the length of the channel portion is at least 0.024 inches.

6. (Withdrawn and currently amended) The injection device of claim 1, wherein the discharge channel portion is provided in the form of a metal tube which is associated with the probe body.

7. (Canceled)

8. (Withdrawn) The injection device of claim 6 wherein the probe body includes a flexible membrane and the metal tube passes through the membrane.

9. (Withdrawn) The injection device of claim 8 wherein the membrane is sufficiently recessed within the probe body that the metal tube does not protrude out of the body until fluid is being expelled from the fluid chamber.

10. (Canceled)

11. (Withdrawn) The injection device of claim 10, wherein the nozzle assembly comprises two sections that are joined by ultrasonic bonding, screwing, friction fitting, adhesive bonding, or snapping.

12. (Withdrawn and currently amended) The injection device of claim 11 wherein one section of the nozzle assembly includes the probe and the other includes a metal tube which is joined to the probe body by a snapping attachment comprising at least one protrusion on a wall of the metal tube and at least one corresponding recess on a wall of the probe body, with the metal tube including the discharge channel portion.

13. (Withdrawn) The injection device of claim 12 wherein the metal tube receives the probe body therein.

14. (Canceled)

15. (Canceled)

16. (Currently amended) An injection device comprising:
a housing, a plunger assembly;
a trigger assembly;
an energy generating source operatively associated with the trigger assembly
so that movement of the trigger assembly activates the energy source to move the plunger in a first direction;; and
a nozzle assembly comprising:
a fluid chamber for holding fluid; and

a nozzle discharge channel in fluid communication with the fluid chamber and ~~ending~~ including a channel portion that ends at an orifice through which fluid is expelled when the plunger is moved in the first direction;

wherein the channel portion has a channel length, and ~~the channel~~ and orifice and the channel portion have a same diameter over the channel length, such that the ~~discharge~~ channel portion has a length-to-diameter ratio over the channel length of greater than 6/1, and the energy source and discharge channel are configured to expel the fluid to jet inject the fluid.

17. (Currently amended) The injection device of claim 16, wherein the orifice channel portion diameter is between 0.004 to 0.012 inches and the ~~discharge~~ channel ~~has a length of~~ is at least 0.024 inches.

18. (Currently amended) The injection device of claim 16, wherein the ~~discharge channel has a length to orifice diameter~~ ratio is between 9/1 and 20/1.

19. (Currently amended) The injection device of claim 1, wherein the ~~discharge channel has a length to orifice diameter~~ ratio is between 9/1 and 20/1.

20. (Currently amended) A needleless jet injection device comprising:
a housing, a plunger assembly;
a trigger assembly;
an energy source operatively associated with the trigger assembly so that movement of the trigger assembly activates the energy source to move the plunger in a first direction;

a fluid chamber for holding fluid; and

a nozzle including a a nozzle discharge channel in fluid communication with the fluid chamber and comprising a channel portion ending at an orifice through which fluid is expelled when the plunger is moved in the first direction;

wherein the channel portion has a length and a diameter, with a ratio of an average length to average diameter ratio of the channel portion being greater than 6/1 measured adjacent the orifice ~~of greater than 6/1~~, such that the energy source has a reduced force generation requirement to expel the fluid to jet inject the fluid.

21. (Currently amended) The injection device of claim 20, wherein the orifice has a diameter that is substantially equal to the channel portion diameter adjacent thereto.

22. (Currently amended) The injection device of claim 21, wherein the channel portion has a constant diameter where the ~~length-to-diameter~~ ratio is measured.

23. (Currently amended) The injection device of claim 20, wherein the ~~discharge channel has a length-to-diameter~~ ratio is between 9/1 and 20/1.

24. (Previously presented) The injection device of claim 20, wherein the energy source and discharge channel are configured to generate substantially steady state pressures of less than 4000 p.s.i.

25. (Previously presented) The injection device of claim 24, wherein the energy source produces up to around 40 lbs to inject the fluid.

26. (New) The injection device of claim 25, wherein the ratio is sufficiently large to jet inject the fluid with a successful injection rate into patients of at least about 98%.

27. (New) The injection device of claim 16, wherein the fluid chamber is significantly larger in cross-sectional area than the channel portion.

28. (New) The injection device of claim 16, wherein the nozzle assembly comprises a tapered portion between the fluid chamber and the discharge channel.

29. (New) The injection device of claim 28, wherein the tapered portion is configured to accommodate the plunger.